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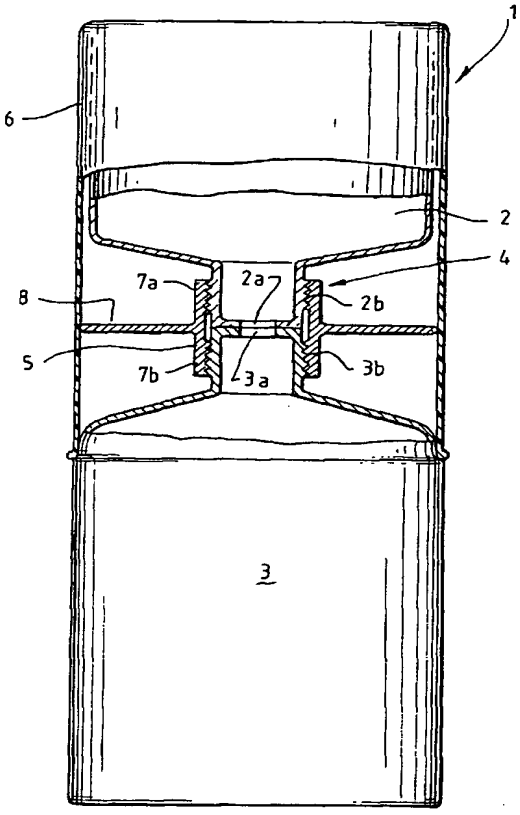
(54) Title: TWIN CHAMBER DISPENSER WITH TWIST VALVE



(57) Abstract: A dispenser (1) for facilitating the dispensing of a flowable material through an outlet, the dispenser comprising: at least two chambers (2 and 3) in fluid communication; and a valve (4) locatable between the chambers, the valve preventing fluid communication between the chambers when the valve is closed, wherein the valve may be actuated to permit selective fluid communication between the chambers, the arrangement being such to permit the dispensing of the combined contents of the chambers.

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Twin chamber dispenser with twist valve

Field of the invention

The present invention relates to dispensers. More particularly, but not exclusively the present invention relates to dispensers for use in storing and dispensing pharmaceutical products.

Background of the invention

In this specification, where a document, act or item of knowledge is referred to or discussed, this reference or discussion is not an admission that the document, act or item of knowledge or any combination thereof was at the priority date:

(i) part of common general knowledge; or

(ii) known to be relevant to an attempt to solve any problem with which this specification is concerned.

Whilst the following discussion concerns pharmaceutical dispensers, it is to be understood that the same principles apply to dispensers housing other flowable material, in particular flowable material which may interact with another material to produce a composition which has some synergistic effect, or material which needs to be diluted or suitably mixed in order to be dispensed in an active or actively effective form.

Pharmaceutical products such as antibiotic mixtures and other chemotherapeutic agents (therapeutic agents) have represented great developments in medical technology and health care. These products can influence the course of bacterial infection and can be used as both a preventive and therapeutic means in dealing with bacterial infection and alleviating the manifestations associated with bacterial infection.

The majority of therapeutic agents are manufactured as 'pro drugs' which are inactive in vitro and need to be metabolized in vivo to give an active component. The pro drugs are usually manufactured in a solid or granulated form. The granulated form is then dissolved in a suitable diluent before

administration to a patient and subsequent absorption into the body. Generally, the pro drug is administered orally and absorbed from the gastrointestinal tract. Administration may also be topical to an epithelial surface, or alternatively via systemic absorption following injection. The pro drug is then metabolized in the body to produce the active drug ready to act against microbiological infection.

Unfortunately these therapeutic agents have unwanted side effects which in some instances may warrant the withdrawal of the drug. These side effects may produce manifestations of relatively minor conditions such as nausea and vomiting, headache and mental depression. In more extreme cases side effects can include more problematic effects such as toxicity, crystalluria and hypersensitivity reactions (such as skin rash, fever and bone marrow depression).

The unwanted side effects are proportional to the concentration of the pro drug. For example, if there is too much granulated drug and/or insufficient diluent, the side effects can increase dramatically to the point that the treatment may need to be withdrawn.

Conversely, there are also ramifications in instances where there is too little drug and/or too much diluent. In this instance the therapeutic dose may be too weak to achieve any therapeutic benefits. There is also the real danger that the microorganisms may mutate and subsequently become resistant to the drug as a result of the administration of the weakened dose resulting in a "super" strain of microorganism with an inbuilt resistance to a drug. This may have far reaching repercussions on health administration as a previous therapeutic regime may now become redundant and require the development of new drugs.

Another disadvantage in the known administration of therapeutic substances is the contamination of the final product during the dilution process. This may occur if, for example, the diluent contains impurities such as dust or chemical residues. The diluent may also contain unwanted microorganisms. In both instances, the impurities may affect the activity of the therapeutic agent.

Often the diluent is water. Although the water supply in some areas is sufficiently pure to enable proper preparation of the therapeutic substance, often

it is unsuitable. This necessitates the use of purified water, which in turn, requires further costs. This may be impractical in third world countries.

Contamination can also occur when the diluent and drug are mixed.

It is also common for therapeutic substances to progressively breakdown once the drug is mixed with the diluent. Hence these preparations have a limited shelf life. This therefore restricts manufacturers from overcoming the above disadvantages by premixing the granulated drug with the diluent and selling a complete product ready for consumption.

The therapeutic product must necessarily be prepared typically by a pharmacist. The dispensing of the diluent with the granulated product must necessarily be undertaken in a sterile environment to reduce the health risks associated with contamination from the external environment. A consequence of requiring skilled operatives to constitute the final product is an increase in costs.

Once again this may not be practical in some circumstances particularly in the relatively poor third world countries where pharmacists and equipment and the general skills associated with the preparation of therapeutic substances are in short supply.

Summary of the invention

The present invention accordingly provides in one embodiment a dispenser for facilitating the dispensing of a flowable material through an outlet, the dispenser comprising at least two chambers in fluid communication; and a valve locatable between the chambers, the valve preventing fluid communication between the chambers when the valve is closed, wherein the valve may be actuated to permit fluid communication between the chambers.

The valve may be a one-way valve for preventing flow or leakage of the contents of the chamber back into the other when the contents are combined.

The arrangement is preferably such that a substrate containing a pharmaceutically active ingredient can be placed in one of the chambers and a diluent in the other of the chambers. In a closed condition, the valve prevents communication between the chambers and separates the substrate from the

diluent. The valve may be actuated to permit fluid communication and interaction, typically in the form of mixing, between the substrate and the diluent.

The dispenser according to the invention preferably allows selective interaction between the substrate and the diluent. The amounts of both substrate and diluent can be accurately measured and inserted in to the dispenser under sterile conditions wile the substrate and diluent are maintained separated. The dispenser accordingly allows selective intermixing in an enclosed substantially sterile environment following actuation of the valve.

A chamber according to the invention will include an outlet. The outlet can take any suitable form. Preferably, the outlet includes a stop releasably locatable in the outlet to maintain sterile conditions within the chamber.

The valve of the dispenser may take any form. Preferably the valve is comprised of two access ports located in complementary ends of the respective chambers. Each access port is defined by withdrawing a portion of the ends of the respective chamber. In a closed configuration the access ports are arranged to prevent fluid communication between the chambers. The access ports can be suitably aligned to define an aperture to facilitate the fluid communication between the chambers.

The chambers may be secured together by a securing means. The securing means may take any suitable form. The securing means permits the relative pivotal movement of the chambers to define the aperture thereby facilitating fluid communication. The securing means may comprise a pin inserted through both chambers to secure the chambers in close registry.

Preferably the two chambers are secured together by a sleeve. Pivotal movement between the chamber is facilitated relative to the fixed point provided by the sleeve. The sleeve may take any suitable form. Preferably, the sleeve is comprised of at least one threaded section. The threaded section can engage a complementary threaded section on a chamber. The threaded engagement allows the chamber to pivotally move in relation to the remaining chamber allowing for the alignment of the access ports and fluid communication between the chambers.

The pivotal movement can be provided by rotating a chamber. The rotation can be in a clockwise or anti-clockwise direction sufficient to align the access ports.

Alternatively the sleeve may be comprised of two threaded portions. The dual threaded portions allow both chambers to pivotally move in relation to each other facilitating the alignment of the access ports and fluid communication between the chambers.

According to another preferred form of the invention, the sleeve may comprise at least one moulded O-ring specifically adapted to receive a portion of a chamber. Preferably the O-ring dimensions correspond to the dimensions of a portion of the chamber. In this embodiment, the access port is located in the chamber portion engaging the O-ring. The portion of the chamber sits inside the O-ring. The dimensions of the O-ring provide sealing engagement with the portion of the chamber. The O-ring permits a chamber to pivotally move relative to the remaining chamber allowing for the alignment of the access ports and fluid communication. The pivotal movement can be provided by rotating either chamber. The rotation can be in a clockwise or anti-clockwise direction sufficient to align the access ports. Alternatively the sleeve is comprised of two O-rings. The dual O-rings allow both chambers to pivotally move in relation to each other to allow for the alignment of the access ports and fluid communication.

It is envisaged within the scope of the present invention that the sleeve may comprise any combination of a threaded portion and an O-ring. It is also envisaged that one of the chambers may be rigidly fixed to the sleeve.

To dispense the contents of the dispenser, a chamber may be unscrewed from the sleeve to allow access to the contents.

Preferably the dispenser includes a cap. The cap may take any suitable form. The cap may be placed at an end of a chamber. The cap can form an integral wall of the chamber. The cap may be secured to the end of this chamber by a cap securing means. The cap securing means may take any form. Preferably the cap securing means comprises a threaded section which may secure the cap to a complementary threaded portion located on a portion of this chamber. To

dispense the contents of the dispenser, the cap can be releasably unscrewed from the dispenser.

In accordance with another preferred form of the invention, the cap may have at least one elongated wall portion wherein the elongated wall portion extends to engage a portion of the remote chamber. In this arrangement, the cap is secured to one chamber and in engagement with the remote chamber. The elongated wall portion may further comprise an inwardly extending segment directed toward the remote chamber. The segment may be releasably placed within a complementary groove locatable on the external surface of the remote chamber. In this arrangement the cap may be used as a means of aligning the respective access ports thereby facilitating fluid communication. The cap can be rotated to permit alignment of the access ports. In this arrangement, the engagement between the cap segment and the groove can further facilitate the securing of the cap to the dispenser.

Alternatively, it is envisaged that a projecting segment can be located on the remote chamber and the complimentary groove located on the internal surface of the cap. In this arrangement, the projecting segment is directed in an outwardly pointing direction directed towards the cap.

In an alternative arrangement, the cap may be secured to the dispenser by the interaction between the projecting segment and the groove. In this arrangement, a portion of the cap engages a portion of the top chamber wherein the top chamber is pivotally movable relative to the remaining chamber to align the access ports. The engagement may be by a cap engagement means. The cap engagement means may take any suitable form.

According to a further preferred form, the sleeve further comprises a radially extending flange. The flange dimensions are specifically adapted wherein a portion of the flange engages a portion of the cap. In this preferred embodiment the cap can be used to allow a chamber to undertake the pivotal movement required to align the access ports. The cap can be rotated wherein a portion of the cap engages the flange to facilitate the alignment of the access ports and fluid communication between the chambers. Alternatively, the requisite

movement can be provided by rotating the remaining chamber. The rotation can be in a clockwise or anti clockwise direction sufficient to align the access ports.

Preferably the cap engages the flange by a flange engaging means. The flange engagement means can take any suitable form. The flange engagement means can include a series of fingers locatable in complementary recesses located on the flange.

According to another preferred form of the invention, at least one chamber comprises an elongated hollow neck. In this embodiment at least one access port is located on the end of the neck. The neck can be moved from a closed position to an open position in order to facilitate fluid communication between each chamber. In a closed position, the access port is sealingly engaged with a portion of the dispenser. In an open position, the movement of the neck relative to the dispenser releases the access port from a sealed engagement to facilitate fluid communication between each chamber.

Preferably, the two chambers are secured together by a sleeve. In a closed position, the neck sealingly engages against a portion of the sleeve. Fluid communication between each chamber is facilitated by movement of the neck from a closed position to an open position. Movement of the neck from a closed position to an open position is facilitated relative to the fixed point provided by the sleeve. The sleeve may take any suitable form. Preferably the sleeve is comprised of at least one threaded section. The threaded section can engage a complementary threaded section of the necked chamber. The threaded engagement allows the neck to move in relation to the sleeve to provide fluid communication between the chambers. The movement of the neck on can be provided by rotating the necked chamber. The rotation can be in a clockwise or anti-clockwise direction sufficient to move the neck from a closed position to an open position.

Alternatively the sleeve is comprised of a sliding means. The sliding means allows the neck to slidingly move from a closed position to an open position to facilitate fluid communication between the chambers. In this embodiment the neck is moved by the application of downward force on the necked chamber.

Alternatively the neck may be moved by the application of upward force on the remaining chamber.

According to a further preferred form of the invention, the neck may be moved to a third locked position wherein a portion of the neck is releasably locatable with the access port of the remaining chamber. Preferably the location of the portion of the neck within the access port seals the remaining chamber to prevent leakage of its contents following fluid communication between the two chambers. Preferably the end of the neck may include a conical head portion to engage the access port and further facilitate the sealing engagement. The neck may include a seal ring. Alternatively the neck may include a circular groove etched in the conical head. The groove can engage an edge of the access port to secure the conical head to the access port to prevent leakage of the contents of chamber. Accordingly in this embodiment the valve arrangement constitutes a one-way valve preventing flow or leakage of the contents of one chamber back into the other.

According to another preferred form of the invention, a portion of the neck may be located in the access port of the remaining chamber. Fluid communication between the chambers may be facilitated by removing the portion of the neck from the access port.

According to a further preferred form of the invention, a position indicator is located on a portion of the dispenser. The indicator may give some indication of the positions of the neck.

Alternatively the sliding means may be adapted to allow the neck to move to regions corresponding to an open, closed and sealing position.

According to another preferred form of the invention, at least one chamber comprises an elongated neck located in a complementary shaft in the other of the chambers.

Preferably the complementary shaft is located in a removable cap. The cap may take any suitable form. The cap may be secured to the other chamber by a cap securing means. The cap securing means may take any suitable form.

Preferably the cap securing means comprises a threaded section which may secure the cap to a complementary threaded portion located on a portion of the other chamber. The threaded cap can be unscrewed from the other container to allow access to the contents.

Preferably the elongated neck is integrally located within the shaft to provide a slide fit between the neck and the shaft. A lubricating means may be placed between the neck and the shaft to facilitate sliding engagement between the neck and the shaft. The lubricating means may take any suitable form. Preferably the lubricating means may include a liquid or powdered lubricating substance.

In this embodiment at least one stop is located on an end of the neck. The stop can take any suitable form. Preferably the stop comprises a perforated disk and a non perforated substantially cone shaped portion. Preferably the disc includes a flanged shoulder. The dimensions of the disc allow the end of the neck to engage the stop by tightly fitting within the recess as defined by the flanged shoulder.

Preferably the cone includes a flanged shoulder. The dimension of the cone's flanged shoulder corresponding to the dimensions of the shaft.

The neck can be moved from a closed position to an open position in order to facilitate fluid communication between each chamber. In a closed position, the stop is sealingly engaged with a portion of the shaft. Preferably the sealing engagement is provided by a sealing means located on the stop. The sealing means may take any suitable form. Preferably the sealing means is a rubber seal provided by a portion of the cone. Alternatively the seal may be provided by the cone's flanged shoulder. It is understood that this type of seal is commonly used when manufacturing seals for hypodermic needles.

In this embodiment, the neck is moved by the application of downward force on the necked chamber when the neck chamber is orientated in a position above the other chamber. The neck subsequently engages the disc to move the stop to an open position.

In an open position, the movement of the neck relative to the shaft releases the stop by engaging the disc and moving the stop from the sealed engagement to facilitate fluid communication between each chamber.

According to a further preferred form of the invention a spacer is provided to space the chambers apart thereby maintaining the neck in a closed position. The spacer may take any suitable form. In order to move the neck from a closed to an open position the spacer is released thereby allowing the neck to move from a closed position to an open position in order to facilitate fluid communication between each chamber.

Preferably the spacer is hingedly attached to a chamber. The spacer may be attached to the other chamber. Preferably the spacer is attached to the cap. The spacer may take the form of a closure plug. The dimensions of the plug may correspond to the dimensions of the shaft opening. The plug may be inserted into the shaft opening to seal the other chamber.

According to this preferred form of the invention the necked chamber may be removed from the other chamber by the application of an upward force on the necked chamber after the fluid communication between the chambers is completed.

The diluent is placed in the necked chamber and the substrate in the other chamber. To facilitate fluid communication between the chambers the spacer is removed. The neck may then be moved from a closed position to an open position in order to facilitate fluid communication between each chamber. In this embodiment the neck is moved by the application of downward force on the necked chamber thereby moving the stop from a sealed engagement with a portion of he shaft.

The necked chamber may subsequently be removed from the other chamber by the application of sufficient upward force on the necked chamber. In this preferred embodiment the stop is returned to its sealing engagement with the shaft thereby providing sufficient positive resistance force to allow for removal of

the neck from the recess defined by the flanged disk. This consequently allows for the removal of the necked chamber.

The spacer may then be placed in the shaft to seal the other chamber wherein the contents of the other chamber remain in a sterile environment.

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Description of the drawings

The invention will now be further explained and illustrated by reference to the accompanying drawings in which:

Figure 1 is a cross-sectional view of a dispenser according to one form of the invention;

Figure 2 is a cross-sectional view of a further embodiment of a dispenser according to the invention; and

Figures 3 to 5 are magnified views of the region marked A, the figures illustrate the neck of the dispenser of Figure 2 in a closed, open and locked position.

Figure 6 is a cross-sectional view of a further embodiment of a dispenser according to the invention

The dispenser 1 includes chambers 2 and 3 and a cap 6. A pharmaceutically active substrate usually in a granulated or powdered form can be placed in a chamber 2. Diluent (not shown) can be placed in the remaining chamber 3. A valve arrangement 4 prohibits fluid communications between the chambers 2 and 3 and separates the pharmaceutical substrate from the diluent.

The valve 4 may be actuated to permit fluid communication and interaction between the substrate and the diluent as required. The dispenser 1 accordingly allows selective interaction between the substrate and the diluent. The amounts of both substrate and diluent can be accurately measured and inserted in to the dispenser 1 under sterile conditions. The dispenser 1 accordingly allows selective intermixing in a sterile environment.

The valve arrangement 4 includes two access ports 2a and 3a respectively located in complementary ends of the chambers 2 and 3. The valve arrangement further includes a sleeve 5. In a closed configuration the access ports 2a and 3a respectively are not aligned so as to prohibit the fluid communication between the chambers. The access ports 2a and 3a can be subsequently aligned to define an aperture to facilitate the fluid communication between the chambers 2 and 3.

Pivotal movement between the chambers 2 and 3 is facilitated relative to the fixed point provided by the sleeve 5. The sleeve 5 is further comprised of two threaded sections 7a and 7b and a radially extending flange 8. The threaded sections engage a complementary threaded section 2b and 3b on each chamber, 2 and 3 respectively. The threaded engagement allows the chambers 2 and 3 to pivot in relation to each other allowing for the alignment of the access ports 2a and 3a and fluid communication between the chambers 2 and 3. The pivoting action can be provided by manually rotating a chamber in either a clockwise or anti clockwise direction.

A cap 6 is placed over one of the chambers 2. The dimensions of the flange 8 are specifically adapted wherein the flange 8 engages a portion of the cap . Hence the cap can be rotated to, via its engagement with the flange, facilitate the alignment of the access ports 2a and 3a and fluid communication between the chambers 2 and 3. The engagement between the flange 8 and the cap is further secured by a series of fingers (not shown) on the internal surface of the cap 6. The fingers are locatable in complementary recesses (not shown) located on the flange 8.

Following the intermixing between the diluent and the substrate, the bottom chamber 3 may be unscrewed from the sleeve 5 and the contents of the chamber 3 consumed.

According to another preferred form of the invention a dispenser 10 includes chambers 12 and 13 and a cap 16. A pharmaceutically active substrate, usually in a granulated or powdered form, can be placed in one chamber 13. Diluent (not shown) can be placed in the remaining chamber 12. The chamber 12 includes an elongated hollow neck 20. The neck 20 has two access ports 21 and 22 located on the end of the neck 20.

The two chambers 12 and 13 are secured together by a sleeve 14. In a closed position, the neck 20 sealingly engages against a portion of the sleeve 14. A sliding means 23 allows the neck 20 to slide from a closed position (Figure 3) to an open position (Figure 4) to facilitate fluid communication between the chambers 12 and 13. The neck 20 is moved by the application of downward force

on the chamber 12. Alternatively, the neck may be moved by pulling the chamber 13 in order to release the neck 20 from sealing engagement.

The neck 20 may be moved to a third locked position as shown in Figure 5 position wherein a portion of the neck is releasably locatable with the access port 13a on the chamber 13 . Preferably the location of the portion of the neck 20 within the access port 13a seals the access port 13a to prevent leakage of the contents of chamber 13 following fluid communication between the two chambers 12 and 13 respectively.

The end of the neck 20 includes a conical head portion 23 to engage the access port 13a and further facilitate the sealing engagement between the neck 20 and access port 13a. A circular groove 25 is etched in the conical head 24. As shown in Figure 5, the groove can engage an edge of the access port 13a to secure the conical head to the access port to prevent leakage of the contents of chamber 13. This also allows the dispenser to be shaken without fear of leakage out of chamber 13 to facilitate the interaction between the diluent and the pharmaceutically active substrate.

A position indicator 30 located on container 13 gives some indication of the positions of the neck 20.

According to another preferred form of the invention a dispenser 100, includes a chamber 101 comprising an elongated neck 102 and an other chamber 110. The neck 102 is located in a complementary shaft 111 located in a removable threaded cap 112. The cap 112 can be unscrewed from the other container 110 to allow access to the contents (not shown).

The neck 102 is integrally located within the shaft 111 to provide a slide fit between the neck 102 and the shaft 111.

A stop 103 is located on an end of the neck 102. The stop 103 comprises a perforated disk 104 and a non perforated substantially cone shaped portion 105. The disc 104 includes a flanged shoulder 104 a. The dimensions of the disc allow the end of the neck 106 to engage the stop 103 by tightly fitting within the recess 107 as defined by the flange 104a.

The cone 105 further includes a flanged shoulder 105a. The dimension of the flanged shoulder 105a correspond to the dimensions of the shaft 111.

The neck 102 can be moved from a closed position to an open position in order to facilitate fluid communication between each chamber. As is shown in figure 6, in a closed position, the stop 103 is sealingly engaged with a portion of the shaft 111 by a rubber seal 108 provided by the flanged shoulder 105a.

The neck is moved by the application of downward force on the necked chamber 101. The neck 102 subsequently engages the disc 104 to move the stop 103 to an open position. In an open position, the movement of the neck 102 relative to the shaft 111 has released the stop 103 by engaging the disc 104 and moving the stop 103 from the sealed engagement to facilitate fluid communication between each chamber.

A spacer 120 is provided to space the chambers 101 and 110 apart thereby maintaining the neck 103 in a closed position. In order to move the neck 102 from a closed to an open position the spacer 120 is released thereby allowing the neck to move from a closed position to an open position in order to facilitate fluid communication between each chamber.

The spacer 120 is in hinged attachment to the cap 112. The spacer 120 serves the function of a closure plug. The dimensions of the spacer correspond to the dimensions of the shaft opening 111. The spacer 120 may be inserted into the shaft opening 111 to seal the chamber 110.

The necked chamber 101 may be removed from the other chamber 110 by the application of an upward force on the necked chamber 101 after the fluid communication between the chambers is completed.

The diluent (not shown) is placed in the necked chamber 101 and the substrate (not shown) in the other chamber 101. To facilitate fluid communication between the chambers the spacer 120 is removed. The neck 102 may then be moved from a closed position to an open position in order to facilitate fluid communication between each chamber.

The necked chamber 101 may subsequently be removed from the other chamber 110 by the application of sufficient upward force on the necked chamber 101. The stop 103 is returned to its sealing engagement with the shaft 111 thereby providing sufficient positive resistance force to allow for removal the neck 102 from the recess defined by the flanged disk 104a . This consequently allows for the removal of the necked chamber 101.

The spacer 120 may then be placed in the shaft opening 111 to seal the other chamber wherein the contents of the other chamber 110 remain in a sterile environment.

The word 'comprising' and forms of the word 'comprising' as used in this description does not limit the invention claimed to exclude any variants or additions.

Modifications and improvements to the invention will be readily apparent to those skilled in the art. Such modifications and improvements are intended to be within the scope of this invention.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A dispenser for facilitating the dispensing of a flowable material through an outlet, the dispenser comprising:

   (a) at least two chambers in fluid communication; and

   (b) a valve locatable between the chambers, the valve preventing fluid communication between the chambers when the valve is closed, wherein the valve may be actuated to permit selective fluid communication between the chambers, the arrangement being such to permit the dispensing of the combined contents of the chambers.

2. The dispenser according to claim 1, wherein said valve is a one-way valve preventing flow or leakage of the contents of one chamber back into the other.

3. The dispenser according to claim 2 wherein a stop is releasably locatable in the outlet to maintain sterile conditions within the dispenser.

4. The dispenser according to claim 1 wherein the valve of the dispenser is comprised of two access ports located in complementary ends of the respective chambers, the access ports capable of being pivotally aligned to define an aperture to facilitate fluid communication between the chambers.

5. The dispenser according to claim 4 wherein the chambers are secured together by a securing means, the securing means permitting relative rotational movement between the chambers to define the aperture.

6. The dispenser according to claim 5 wherein the securing means comprises a pin inserted through both chambers to secure the chambers in close registry and permit relative rotational movement between the chambers.

7. The dispenser according to claim 4 wherein the chambers are secured together by a sleeve, the sleeve permitting relative rotational movement between the chambers.

8. The dispenser according to claim 7 wherein the sleeve is comprised of at least one threaded section to engage a complementary threaded section on a chamber, the threaded section permitting relative rotational movement between the chambers.

9. The dispenser according to claim 7 wherein the sleeve is comprised of at least one moulded O-ring specifically adapted to receive a portion of a chamber, the O-ring permitting relative rotational movement between the chambers.

10. The dispenser according to claim 7 wherein the sleeve is comprised of a combination of at least one threaded portion and at least one O-ring.

11. The dispenser according to claim 7 wherein a chamber is unscrewed from the sleeve to enable the combined contents of the dispenser to be dispensed.

12. The dispenser according to claim 1 or claim 4 further comprising a cap secured to an end of a chamber by a cap securing means, the cap being releasably unscrewed from the dispenser to enable the combined contents of the dispenser to be dispensed.

13. The dispenser according to claim 12 wherein the cap securing means comprises a threaded section to secure to a complementary threaded portion located on a portion of the chamber.

14. The dispenser according to claim 12 wherein the cap comprises an elongated wall portion extending to engage a portion of the remote chamber, the cap permitting relative rotational movement between the chambers.

15. The dispenser according to claim 14 wherein the elongated wall portion comprise an inwardly extending segment directed toward

the remote chamber and releasably placed within a complementary groove locatable on the external surface of the remote chamber.

16. The dispenser according to claim 14 wherein a projecting segment is locatable on the remote chamber and the complimentary groove is located on the internal surface of the cap.

17. The dispenser according to claim 4 wherein the sleeve further comprises a radially extending flange, wherein a portion of the flange engages a portion of the cap.

18. The dispenser according to claim 17 wherein the cap engages the flange by a flange engaging means.

19. The dispenser according to claim 18 wherein the flange engagement means comprises a series of fingers locatable in complementary recesses located on the flange.

20. The dispenser according to claim 12 wherein the cap and a chamber are unscrewed from the sleeve to enable the combined contents of the dispenser to be dispensed.

21. The dispenser according to claim 20 wherein the cap and a chamber are simultaneously unscrewed.

22. The dispenser according to claim 1 wherein at least one chamber comprises an elongated hollow neck, the neck capable of being moved from a closed position to an open position in order to facilitate fluid communication between each chamber.

23. The dispenser according to claim 22 wherein the two chambers are secured together by a sleeve, wherein in a closed position, the neck sealingly engages against a portion of the sleeve, fluid communication between each chamber being facilitated by movement of the neck from a closed position to an open position.

24. The dispenser according to claim 22 wherein the sleeve is comprised of at least one threaded section, the threaded section engaging a complementary threaded section on the necked chamber.

25 The dispenser according to claim 22 wherein the threaded engagement allows for relative rotational movement between the chambers.

26. The dispenser according to claim 23 wherein the sleeve comprises a sliding means, the sliding means allowing the neck to slidingly move from a closed position to an open position to facilitate selective fluid communication between the chambers.

27. The dispenser according to claim 26 wherein the neck is movable to a third locked position wherein a portion of the neck is releasably locatable with the access port of the remaining chamber to seal the remaining chamber and prevent leakage of the remaining chamber's contents following fluid communication between the chambers.

28. The dispenser according to claim 27 wherein the end of the neck further comprises a conical head portion to engage the access port of the remaining chamber.

29. The dispenser according to claim 27 wherein the neck comprises a seal ring.

30. The dispenser according to claim 27 wherein the neck comprises a circular groove etched in the conical head, the groove capable of engaging an edge of the access port and prevent leakage of the contents of the remaining chamber.

31. The dispenser according to claim 22 comprising a position indicator located on a portion of the dispenser to give an indication of the positions of the neck.

32. The dispenser according to claim 1 wherein at least one chamber comprises an elongated neck located in a complementary shaft in the other of the chambers.

33. The dispenser according to claim 32 wherein the elongated neck is integrally located within the shaft to provide a slide fit between the neck and the shaft.

34. The dispenser according to claim 32 wherein at least one stop is located on an end of the neck.

35. The dispenser according to claim 34 wherein the stop comprises a perforated disk and a non perforated substantially cone shaped portion.

36. The dispenser according to claim 35 wherein the disc further comprises a flanged shoulder.

37. The dispenser according to claim 35 wherein the cone comprises a flanged shoulder.

38. The dispenser according to claim 32 wherein the neck is moved from a closed position to an open position in order to facilitate fluid communication between each chamber wherein in a closed position, the stop is sealingly engaged with a portion of the shaft.

39. The dispenser according to claim 38 wherein the sealing engagement is provided by a sealing means located on the stop.

40. The dispenser according to claim 32 wherein the complementary shaft is located in a removable cap, the cap being releasably unscrewed from the dispenser to dispense the contents of the dispenser.

41. The dispenser according to claim 40 wherein a spacer is provided to space the chambers apart thereby maintaining the neck in a closed position.

42. The dispenser according to claim 41 wherein the spacer is capable of insertion into the shaft opening to seal the other chamber.

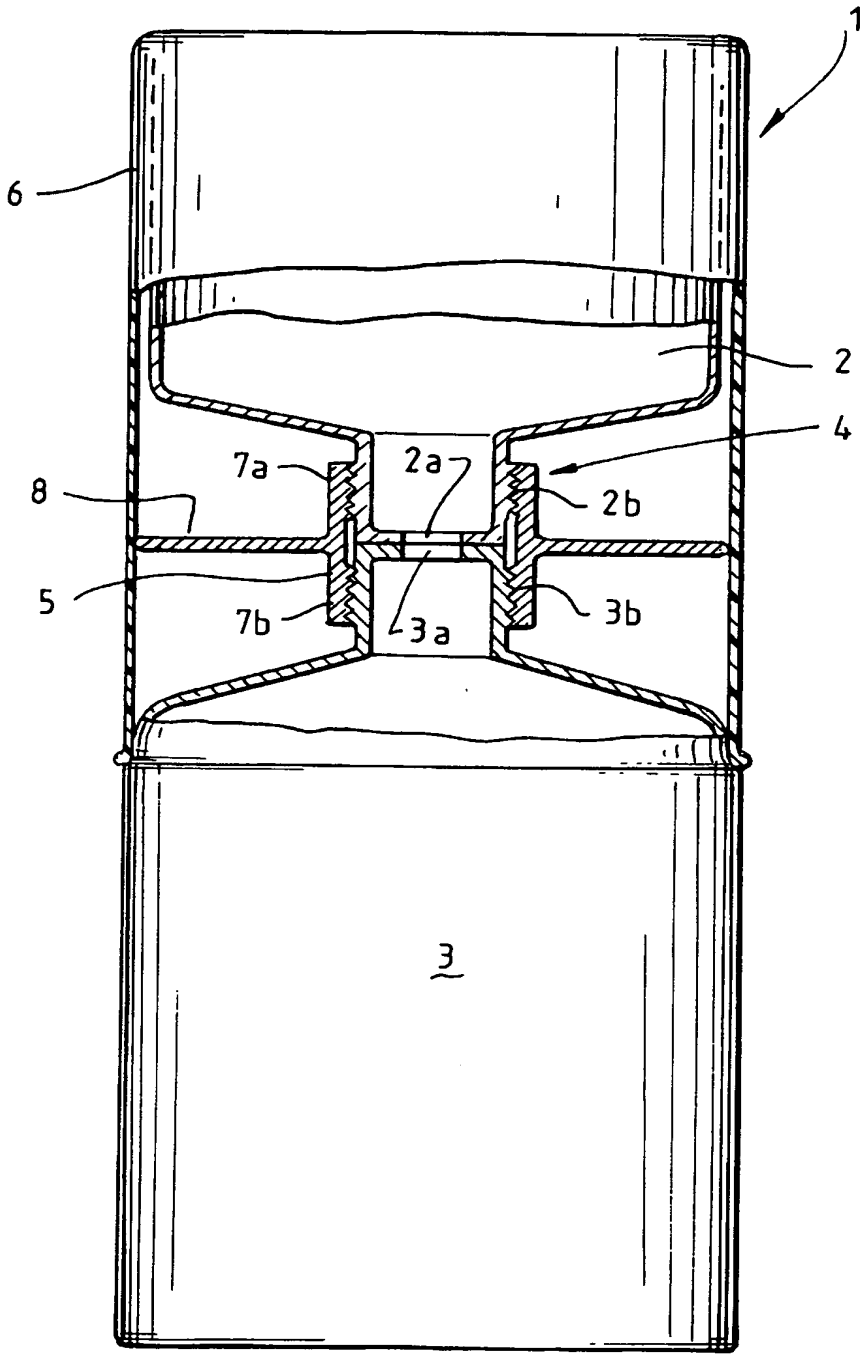

FIG. 1.

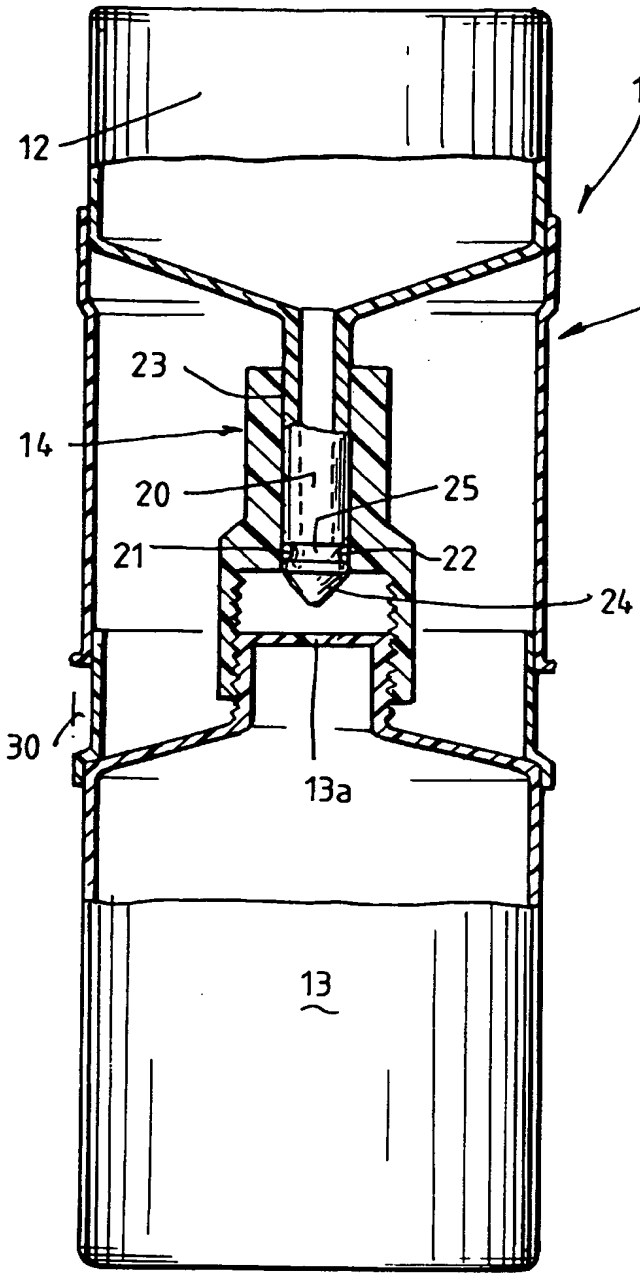

FIG. 2.

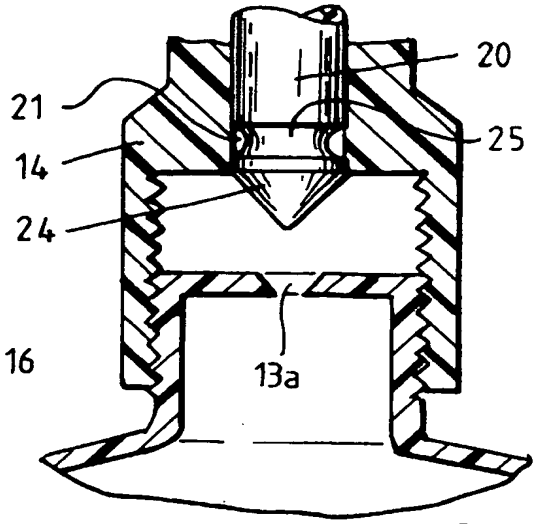

FIG. 3.

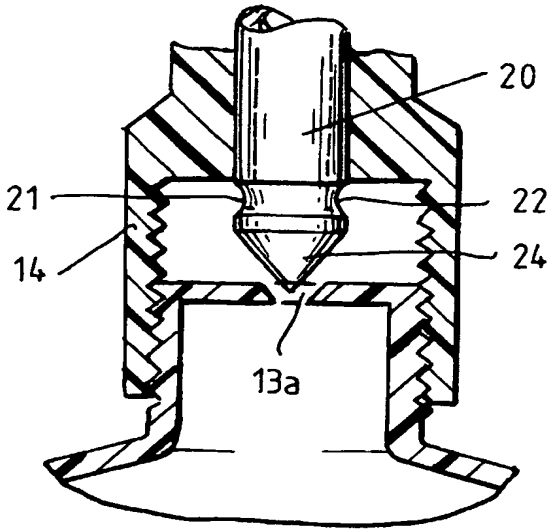

FIG. 4.

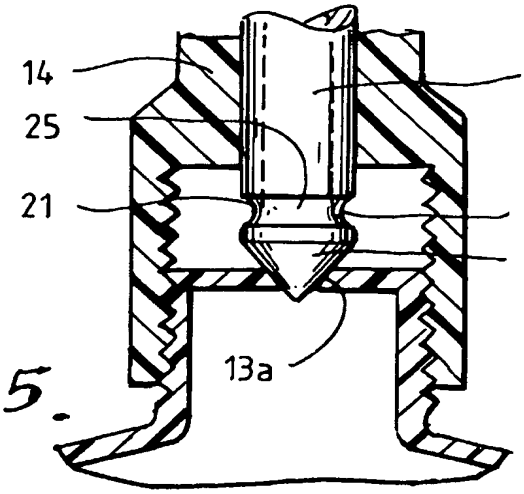

FIG. 5.

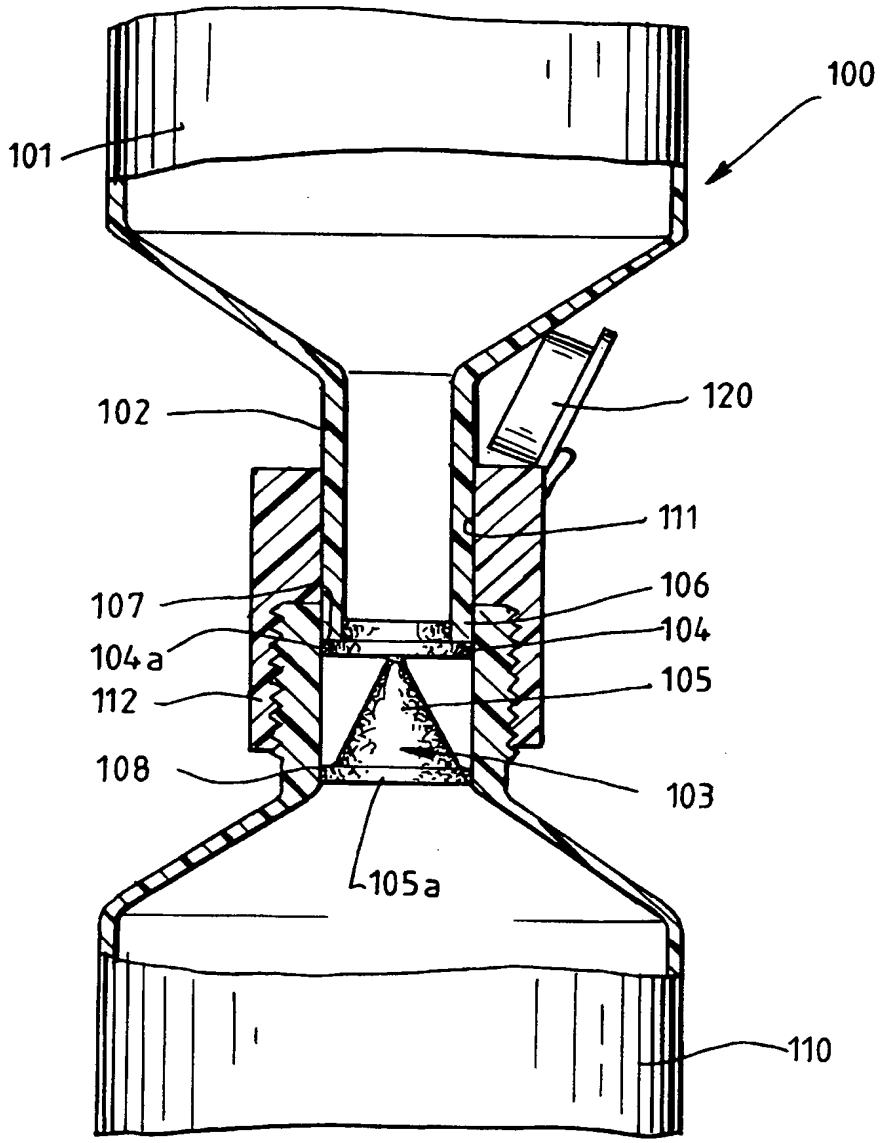

FIG. 6.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU02/00377

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. [7]: A61J 1/00 B65D 81/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

SEE ELECTRONIC DATABASES CONSULTED

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

AU IPC: A61J 1/00 B65D 81/32, 83/00 B67D 5/56

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DWPI JAPIO: drug pharm medic therapeutic mix admix combine intermix interact vale select chamber bottle container receptacle rotate twist turn screw wind wound A61J B65D B67D A61C

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 279727 B1 (SOFAB) 24 August 1988 Figure 1	1
X	WO 94/16664 A1 (BAXTER INTERNATIONAL, INC) 4 August 1994 Pages 3 to 7	1-2
X	WO 95/32015 A1 (MEYER) 30 November 1995 Figures and abstract	1-3, 12-13, 32-34

[X] Further documents are listed in the continuation of Box C [X] See patent family annex

* Special categories of cited documents:

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
7 June 2002	13 JUN 2002
Name and mailing address of the ISA/AU	Authorized officer
AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	MATTHEW FORWARD Telephone No : (02) 6283 2606

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU02/00377

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2335179 A (BESPAK PLC) 15 September 1999 Page 8 lines 24 to 34, figures	1-3, 12-16, 22-27, 32-33
X	WO 98/38962 A1 (CAOLA) 11 September 1998 Pages 5 and 6, figures	1-3, 12-13
X	DE 19746339 A1 (KREISCHER) 4 March 1999 Figures	1-2, 12-13, 22-25, 32-34
X	WO 99/09931 A1 (PENTAPHARM AG) 4 March 1999 Entire document	1-3, 12-14, 32-36
X	WO 00/24649 A1 (GILTECH LIMITED) 4 May 2000 Figures 1 to 11, pages 15 to 19	1-3

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/AU02/00377

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
EP	279727	FR	2610602	US	4969579		
WO	94/16664	AU	60293/94	AU	20215/95	CA	2130833
		EP	636018	NZ	261517	SG	48090
		US	5431496				
WO	95/32015	AU	66439/94	CZ	9600319	FI	960320
		NO	960286	PL	312713	SK	228/96
GB	2335179	NO	FAMILY				
WO	98/38962	AU	67580/98	US	5794802		
DE	19746339	NO	FAMILY				
WO	99/09931	AU	46187/97	EP	1009356	US	6237649
		PL	338582				
WO	00/24649	US	6187290	AU	63556/99	EP	1127016

END OF ANNEX